VODN46xxIR

IR Speed Dome

Installation manual

V1.0.0

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Regulatory Information

FCC Information

FCC compliance: This equipment has been tested and found to comply with the limits for a digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Conditions

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

EU Conformity Statement

This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the Low Voltage Directive 2006/95/EC, the EMC Directive 2004/108/EC.

2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info.

Description on Laser Specification

The optical disc drive such as DVD Super Multi (Double Layer) Drive 22X that is used in this computer is equipped with laser. The classification label with the following sentence is affixed to the surface of the drive.

CLASS 1 LASER

PRODUCT TO IEC60825-1

LASER KLASSE 1

The drive with the above label is certified by the manufacturer that the drive complies with the requirement for laser product on the date of manufacturing pursuant to article 21 of Code of Federal Regulations by the United States of America, Department of Health & Human Services, Food and Drug Administration.

In other countries, the drive is certified to comply with the requirement pursuant to IEC 60825-1 and EN 60825-1 on class 1 laser product.

This computer is equipped with the optical disc drive in the following list according to the model.

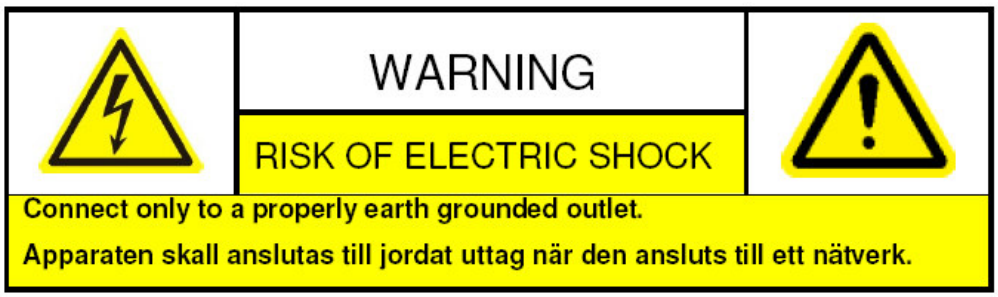
Safety Warnings and Cautions

Please pay attention to the following warnings and cautions:

Hazardous Voltage may be present: Special measures and precautions must be taken when using this device. Some potentials (voltages) on the device may present a hazard to the user. This device should only be used by employees from our company with knowledge and training in working with these types of devices that contain live circuits.

Caution
The power supply in this product contains no user-serviceable parts. Refer servicing only to qualified personel.

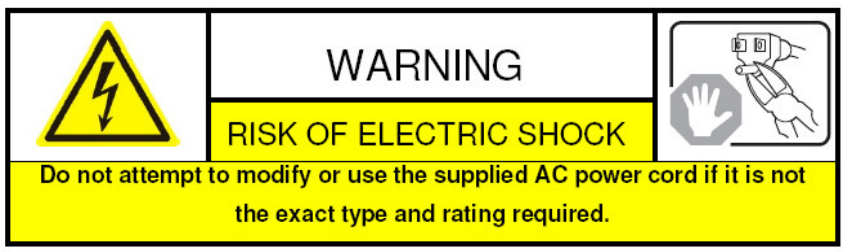
Power Supply Hazardous Voltage: AC mains voltages are present within the power supply assembly. This device must be connected to a UL approved, completely enclosed power supply, of the proper rated voltage and current. **No user serviceable parts inside the power supply.**


WARNING
RISK OF ELECTRIC SHOCK
Connect only to a properly earth grounded outlet.
Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk.

System Grounding (Earthing): To avoid shock, ensure that all AC wiring is not exposed and that the earth grounding is maintained. Ensure that any equipment to which this device will be attached is also connected to properly wired grounded receptacles and are approved medical devices.

Power Connect and Disconnect: The AC power supply cord is the main disconnect device to mains (AC power).The socket outlet shall be installed near the equipment and shall be readily accessible.

Installation and Maintenance: Do not connect/disconnect any cables to or perform installation/maintenance on this device during an electrical storm.


WARNING
RISK OF ELECTRIC SHOCK
Do not attempt to modify or use the supplied AC power cord if it is not the exact type and rating required.

Power Cord Requirements: The connector that plugs into the wall outlet must be a grounding-type male plug designed for

use in your region. It must have certification marks showing certification by an agency in your region. The connector that plugs into the AC receptacle on the power supply must be an IEC 320, sheet C13, female connector. See the following website for more information http://kropla.com/electric2.htm.

Lithium Battery: This device contains a Lithium Battery. There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the vendor's instructions and in accordance with local environmental regulations.

Perchlorate Material: Special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate. This notice is required by California Code of Regulations, Title 22, Division 4.5, Chapter 33: Best Management Practices for Perchlorate Materials. This device includes a battery which contains perchlorate material.

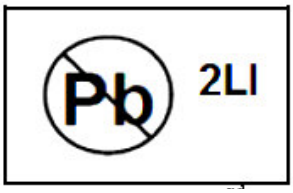
Taiwan battery recycling:

Please recycle batteries.

Thermal and Mechanical Injury: Some components such as heat sinks, power regulators, and processors may be hot; care should be taken to avoid contact with these components.

Electro Magnetic Interference: This equipment has not been tested for compliance with emissions limits of FCC and similar international regulations. This device is not, and may not be, offered for sale or lease, or sold, or leased until authorization from the United States FCC or its equivalent in other countries has been obtained. Use of this equipment in a residential location is prohibited. This equipment generates, uses and can radiate radio frequency energy which may result in harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is required to take measures to eliminate the interference or discontinue the use of this equipment.

Lead Content:



Please recycle this device in a responsible manner. Refer to local environmental regulations for proper recycling; do not dispose of device in unsorted municipal waste.

Safety Instruction

These instructions are intended to ensure that the user can use the product correctly to avoid danger or property loss.

The precaution measure is divided into 'Warnings' and 'Cautions':

Warnings: Serious injury or death may be caused if any of these warnings are neglected.

Cautions: Injury or equipment damage may be caused if any of these cautions are neglected.

Warnings Follow these safeguards to prevent serious injury or death.	**Cautions** Follow these precautions to prevent potential injury or material damage.

Warnings

- In the use of the product, you must strictly comply with the electrical safety regulations of the nation and region.
- Please use the power adapter which is provided by normal company. The adapter should be AC 24V/3A according to dome model.
- Do not connect several devices to one power adapter as an adapter overload may cause over-heating and can be a fire hazard.
- Please make sure that the power has been disconnected before you wire, install or dismantle the speed dome.
- When the product is installed on a wall or ceiling, the device should be firmly fixed.
- If smoke, odor, or noise rise from the device, turn off the power at once and unplug the power cable, then contact the service center.
- If the product does not work properly, please contact your dealer or the nearest service center. Never attempt to disassemble the camera yourself. (We shall not assume any responsibility for problems caused by unauthorized repair or maintenance.)

Cautions

- Do not drop the dome or subject it to physical shock, and do not expose it to high electromagnetism radiation. Avoid the equipment installation on vibrations surface or places subject to shock (ignorance can cause equipment damage).
- Do not place the dome in extremely hot, cold (the operating temperature shall be -30°C ~ +65°C), dusty or damp locations, or fire or electrical shock will occur otherwise.
- The dome cover for indoor use shall be kept from rain and moisture.
- Exposing the equipment to direct sun light, low ventilation or heat source such as heater or radiator is forbidden (ignorance can cause fire danger).
- Do not aim the camera at the sun or extra bright places. A blooming or smear may occur otherwise (which is not a malfunction however), and affecting the endurance of sensor at the same time.
- Please use the provided glove when open up the dome cover, avoid direct contact with the dome cover, because the acidic sweat of the fingers may erode the surface coating of the dome cover.
- Please use a soft and dry cloth when clean inside and outside surfaces of the dome cover, not to use alkaline detergents.
- Do not stare at infrared lights closely to avoid hurting your eyes when the infrared lights are on.
- Improper use or replacement of the battery may result in hazard of explosion. Replace with the same or equivalent type only. Dispose of used batteries according to the instructions provided by the battery manufacturer.

Preparation for Installation

- Basic requirements.
  - ♦ All the electronic operation should be strictly compliance with the electrical safety regulations, fire prevention regulations and other related regulations in your local region.
  - ♦ Check whether all the accessories are included according to the packing list. Make sure that the installation place and mode conform to the demands. If not, please contact the supplier.
  - ♦ Please use this product according to the requirement of working environment.
- Check installation space.

  Make sure the place have enough space to install the speed domes and its accessories.
- Check the intensity of conformation at the installation location.

  Please make sure that the ceilings or walls are strong enough to withstand four times the weight of speed dome and its accessories.
- Preparation of cables.
  - ♦ Choose the video cable according to the transmission distance. The video should meet the least demands as: 75Ω resistance; 100% copper core conducting wire; 95% weaving copper shield.
  - ♦ RS485 communication cable, please refer to Appendix 2
  - ♦ 24V AC power cable, please refer to Appendix 3
- Please keep all wrappers.

  Please keep all wrappers after unpack them for future use. In case of any failure occurred, you need to return the speed dome to the factory with the original wrapper.

Note: Transportation without the original wrapper may result in damage on the speed dome and lead to additional costs.

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Chapter 1 Installation

Before you start:

Check the package contents and make sure that the device in the package is in good condition and all the assembly parts are included.

Note: The adapter should be AC 24V/3A.

1.1 Installation and Cabling

1.1.1 Installing the Speed Dome

Steps:

1. Install the mount for the speed dome. Please refer to the chapter 2, 3, 4 and 5 for details about the installing steps.

Notes:

- For cement wall mounting, you need to use the expansion screw to fix the mount. The mounting hole of the expansion pipe on the wall should align with the mounting hole on the mount.
- For wooden wall mounting, you can just use the self-tapping screw to fix the bracket.

2. Install the speed dome to the mount. The wall mount is taken as an example below.
   1) Wrap the thread compound to the thread of the mounting adapter. The mounting adapter is shown in Figure 1-1.

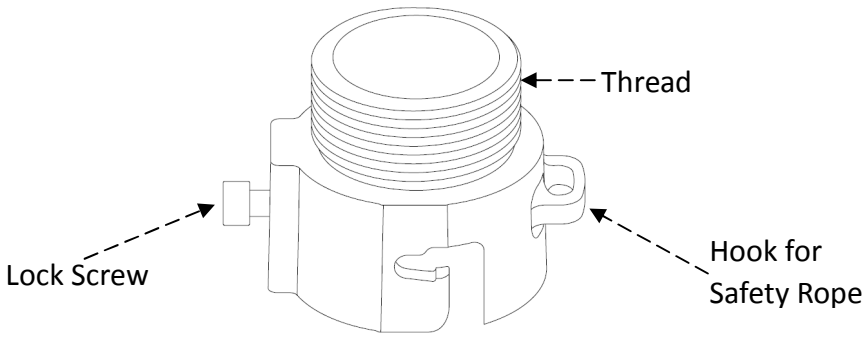

Figure 1-1 Mounting Adapter

   2) Rotate the mounting adapter to the wall mount. Secure the mounting adapter to the wall mount tightly with lock screw as shown in Figure 1-2.

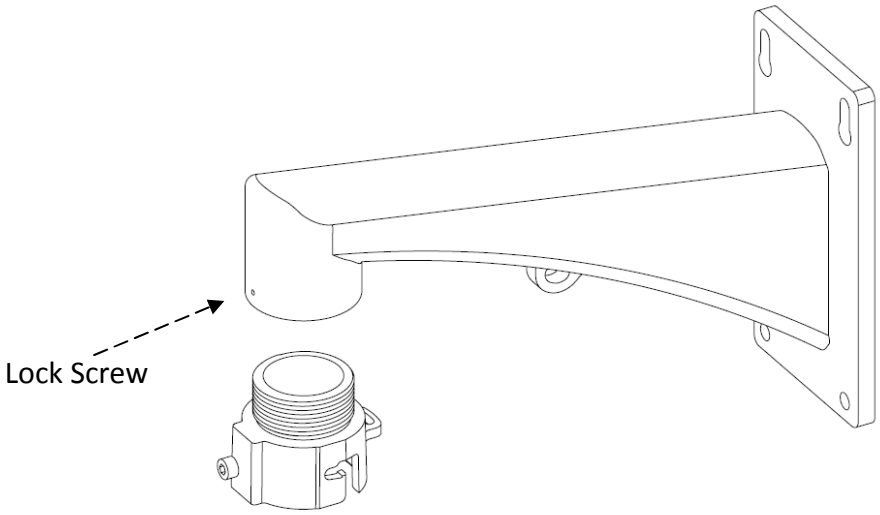

Figure 1-2 Secure the Mounting Adapter

3) Tear off the protective sticker as shown in Figure 1-3.
4) Set the address, baudrate, protocol, etc. by switching the DIP switch in the speed dome. For the details about DIP switch settings, please refer to section *1.2 DIP Switch Settings*.

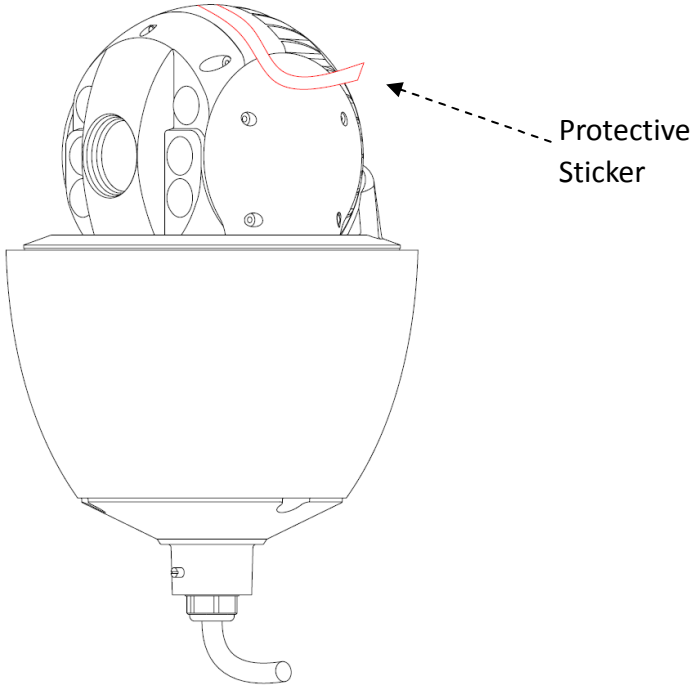

Figure 1-3 Tear off the Protective Sticker

5) Hang the safety rope to the speed dome and the hook on the mounting adapter as shown in Figure 1-4.
6) Route the cables of the speed dome through the wall mount.
7) Insert the hangers on the speed dome to the grooves on the mounting adapter. Rotate the speed dome clockwise to snap the hangers into the grooves as shown in Figure 1-4.

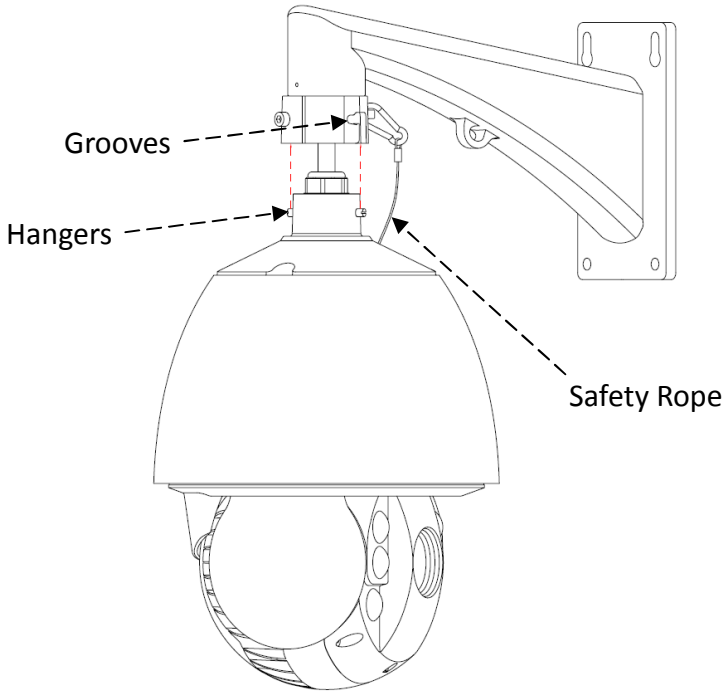

Figure 1-4 Install the Speed Dome

8) Use the allen key to tighten the lock screw on the mounting adapter for ensuring the speed dome is secured tightly.

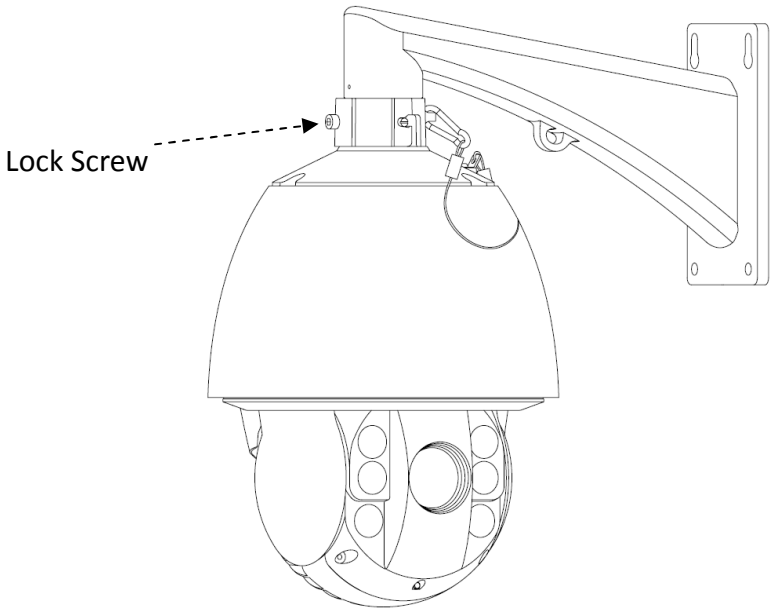

Figure 1-5 Secure the Speed Dome

1.1.2 Connecting the Cables

Before you start:
Please make sure to cut off the power of the dome before connect the cables.

The cable interfaces of speed dome are shown in Figure 1-6. Please refer to the following figure for the RS-485, power and video cables.

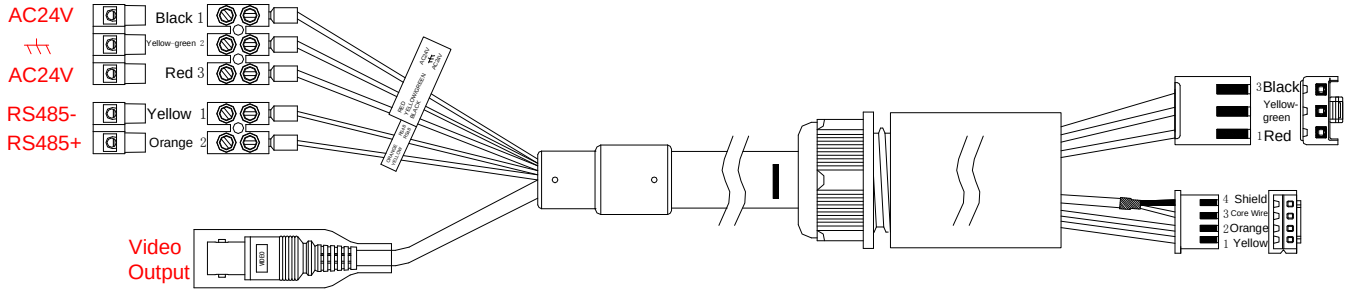

Figure 1-6 Cables of the Speed Dome

1.2 DIP Switch Settings

The DIP switch is used for setting the address, baudrate, protocol, etc. for the speed dome, with value ON=1 and OFF=0, as shown in Figure 1-7.

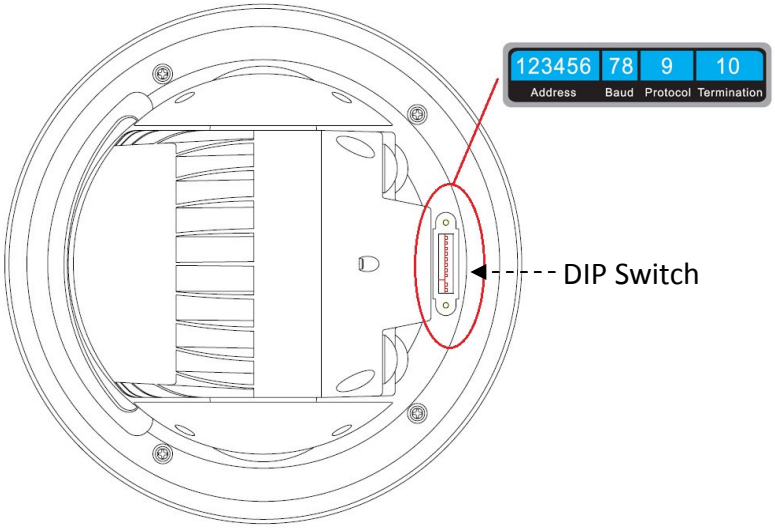

Figure 1-7 DIP Switch

The switches from the first to the sixth are used to set the address. The seventh and eighth switches are used to set the baudrate. The ninth switch is used to set the protocol. The tenth switch is used to set the terminal resistor. Please refer to the section 1.2.1 to 1.2.4 for detailed settings.

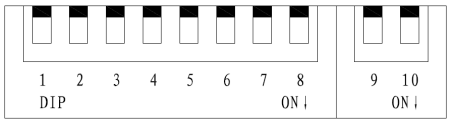

Figure 1-8 DIP Switch

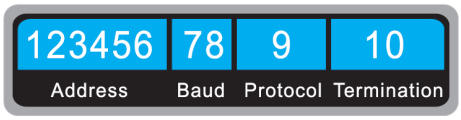

Figure 1-9 DIP Switch Label

Notes:

- The default dome address is 0. The default baudrate is 2400, and the default status of the 120Ω terminator is OFF.
- The speed dome is self-adaptive to the Pelco-P, Pelco-D and Private-Code. You don't have to set the RS-485 control protocol by the DIP switch.

1.2.1 Address Settings

The switches from 1 to 6 are used for setting the address of speed dome. You can refer to Table 1-1 for details of setting the speed dome address to a specific number.

Table 1-1 Set the Dome Address

	Switch Number					
Dome Address	1	2	3	4	5	6
0	OFF	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF

17	ON	OFF	OFF	OFF	ON	OFF
18	OFF	ON	OFF	OFF	ON	OFF
19	ON	ON	OFF	OFF	ON	OFF
20	OFF	OFF	ON	OFF	ON	OFF
21	ON	OFF	ON	OFF	ON	OFF
22	OFF	ON	ON	OFF	ON	OFF
23	ON	ON	ON	OFF	ON	OFF
24	OFF	OFF	OFF	ON	ON	OFF
25	ON	OFF	OFF	ON	ON	OFF
26	OFF	ON	OFF	ON	ON	OFF
27	ON	ON	OFF	ON	ON	OFF
28	OFF	OFF	ON	ON	ON	OFF
29	ON	OFF	ON	ON	ON	OFF
30	OFF	ON	ON	ON	ON	OFF
31	ON	ON	ON	ON	ON	OFF
32	OFF	OFF	OFF	OFF	OFF	ON
33	ON	OFF	OFF	OFF	OFF	ON
34	OFF	ON	OFF	OFF	OFF	ON
35	ON	ON	OFF	OFF	OFF	ON
36	OFF	OFF	ON	OFF	OFF	ON
37	ON	OFF	ON	OFF	OFF	ON
38	OFF	ON	ON	OFF	OFF	ON
39	ON	ON	ON	OFF	OFF	ON
40	OFF	OFF	OFF	ON	OFF	ON
41	ON	OFF	OFF	ON	OFF	ON
42	OFF	ON	OFF	ON	OFF	ON
43	ON	ON	OFF	ON	OFF	ON
44	OFF	OFF	ON	ON	OFF	ON
45	ON	OFF	ON	ON	OFF	ON
46	OFF	ON	ON	ON	OFF	ON
47	ON	ON	ON	ON	OFF	ON
48	OFF	OFF	OFF	OFF	ON	ON
49	ON	OFF	OFF	OFF	ON	ON
50	OFF	ON	OFF	OFF	ON	ON
51	ON	ON	OFF	OFF	ON	ON
52	OFF	OFF	ON	OFF	ON	ON
53	ON	OFF	ON	OFF	ON	ON
54	OFF	ON	ON	OFF	ON	ON
55	ON	ON	ON	OFF	ON	ON
56	OFF	OFF	OFF	ON	ON	ON
57	ON	OFF	OFF	ON	ON	ON
58	OFF	ON	OFF	ON	ON	ON
59	ON	ON	OFF	ON	ON	ON
60	OFF	OFF	ON	ON	ON	ON

61	ON	OFF	ON	ON	ON	ON
62	OFF	ON	ON	ON	ON	ON
63	ON	ON	ON	ON	ON	ON

1.2.2 Baudrate Settings

The number 7 and 8 DIP switches are used for setting the baudrate of the speed dome. The baudrate can be 2400bps, 4800bps and 9600bps. The baudrate will be set as 2400bps by default if it is out of this range. Refer to the following table:

Table 1-2 Set the Baudrate of the Dome

Switch Number / Baudrate	7	8
2400	OFF	OFF
4800	ON	OFF
9600	OFF	ON

1.2.3 Number 9 DIP Switch

The number 9 DIP switch is a reserved switch.

1.2.4 Terminal Resistor Settings

The number 10 DIP switch is used for turning on or off the 120Ω terminal resistor.

Table 1-3 Set Terminal Resistor

Switch Number / Description	10
Turn on the resistor	OFF
Turn off the resistor	ON

1.3 Power Cable Requirement

When the speed dome uses standard AC power supply, the power cable should meet the demand. The formula of the cross-section S (mm²) and the maximum transmission distance L (m) of the bare wire is L=50*S.

Example:

The cross-section of the cable is 1mm² and the transmission distance is less than 50m.
According to the Appendix 3 Wire Gauge Standards, for example, the American wire gauge 18, the transmission distance should be 0.7854*50=39.27m.

Chapter 2 Mount Dimension

2.1 Long Wall Mount

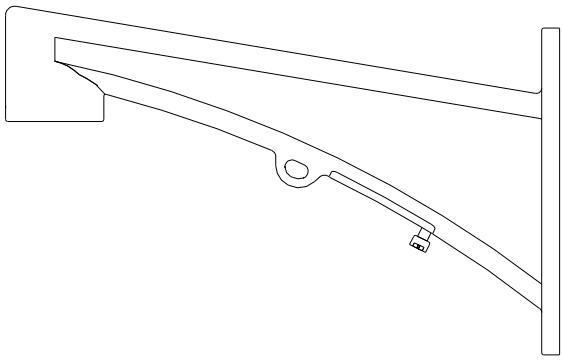

Figure 2-1 Long Wall Mount

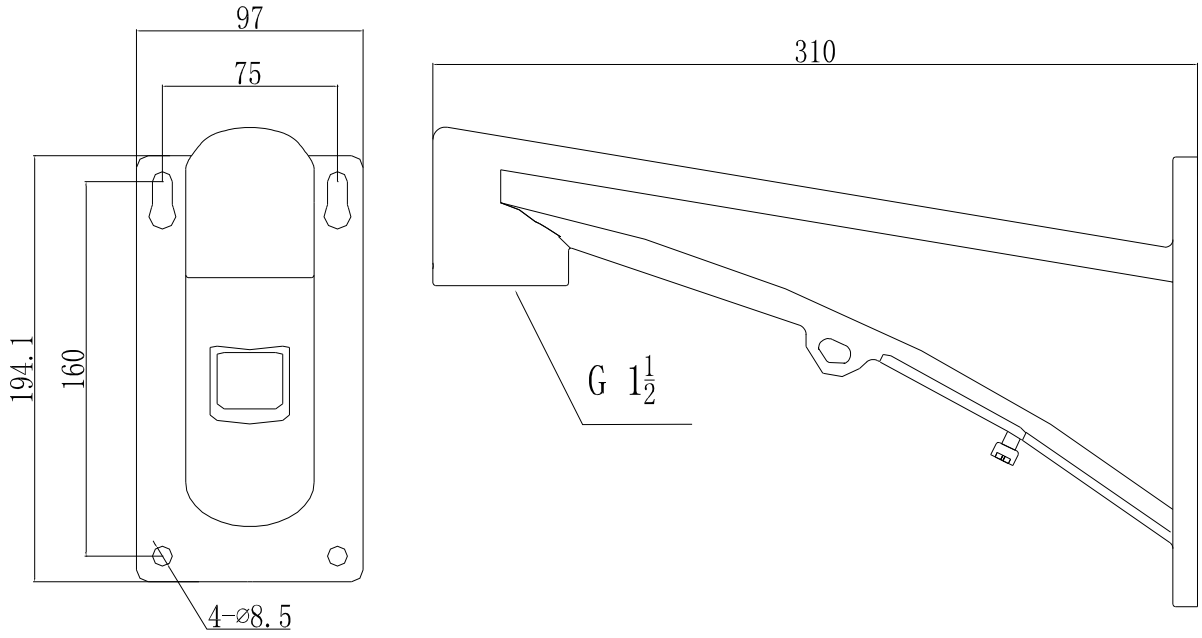

Figure 2-2 Wall Mount Dimensions

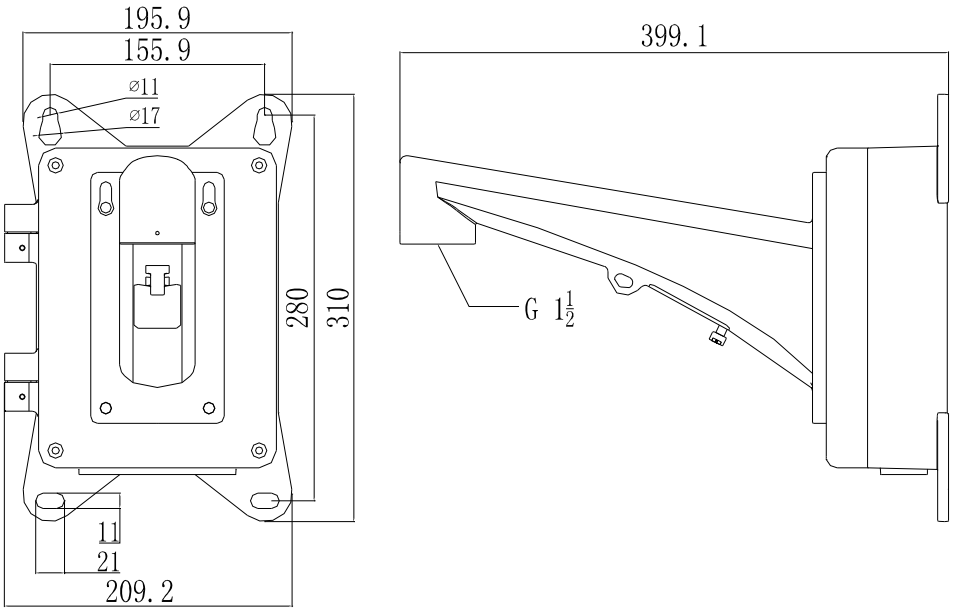

Figure 2-3 Wall Mount with Power Supply Box

2.2 Short Wall Mount

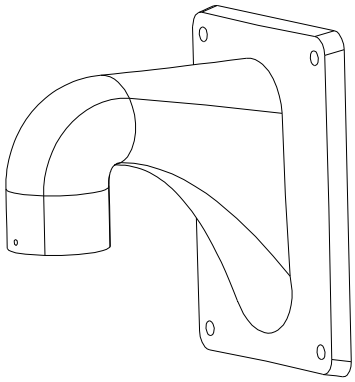

Figure 2-4 Short Wall Mount

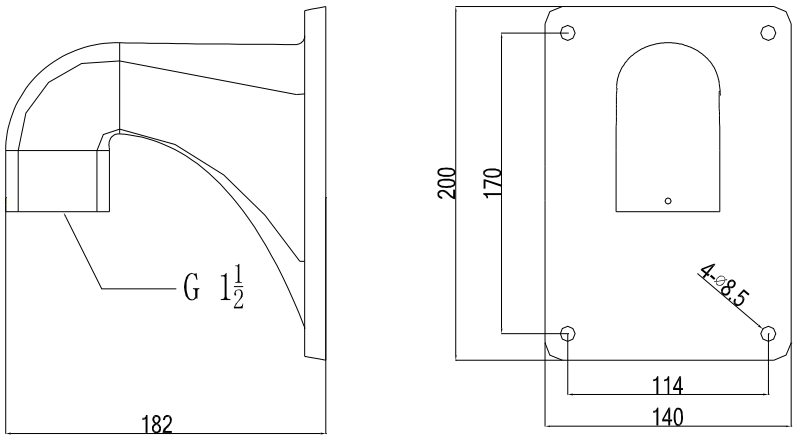

Figure 2-5 Short Wall Mount Dimensions

2.3 Corner Adapter

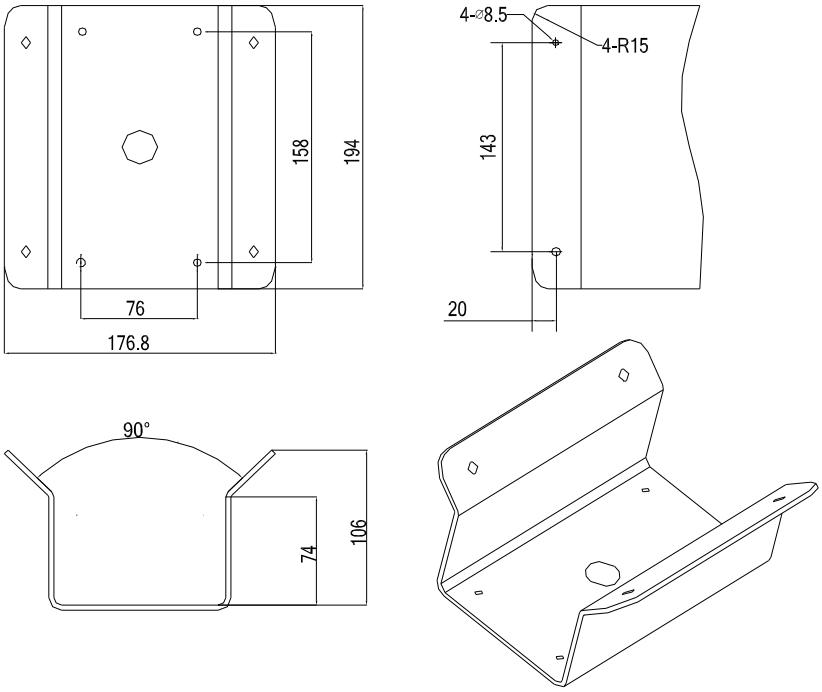

Figure 2-6 Corner Mount

2.4 Pole Adapter

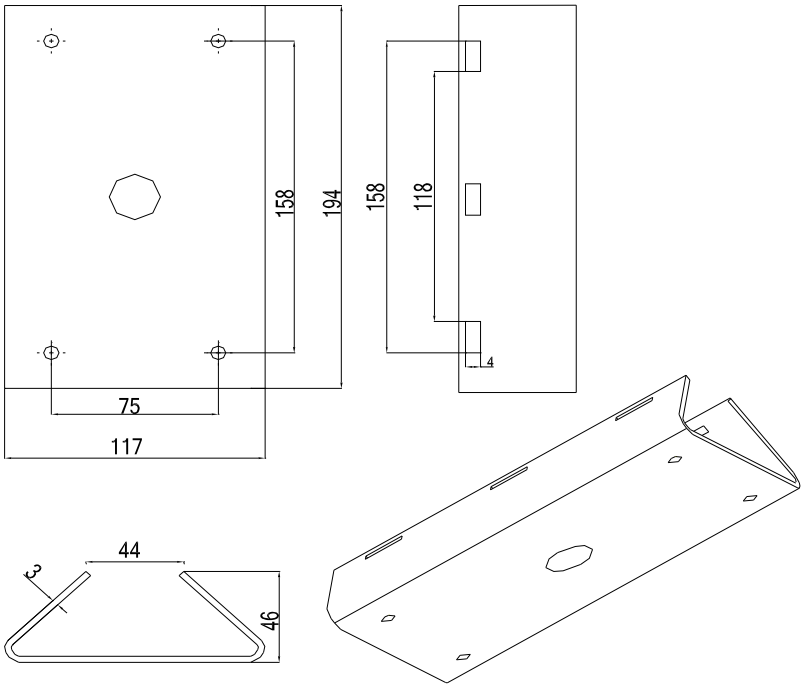

Figure 2-7 Pole Mount

Chapter 3 Mounting Instructions

Before you start:

- For cement walls, expansion screws are needed for mounting (mounting in cement walls are taken as examples in blow sections).
- For wooden walls, you need to use self-tapping screws.
- Please make sure that the wall is sturdy enough to withstand more than 8 times the weight of the dome and the bracket. If not, the dome may fall and cause serious damage.

3.1 Wall Mounting

Notes:

- Wall mounting is applicable to indoor/outdoor suspending domes. For outdoor applications, please adopt the water-proof components.
- Long mount and mount with power supply box are taken as examples in this section.
- Short mount is not recommended for outdoor applications.

3.1.1 Components

- Wall Mounts

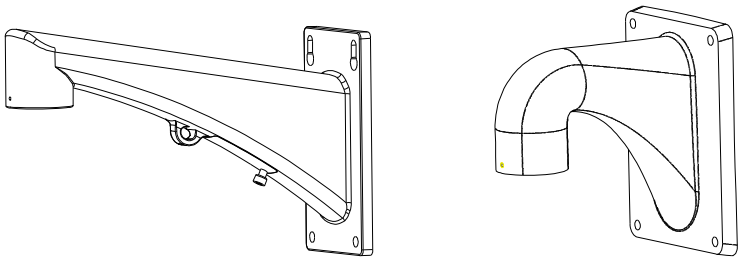

Figure 3-1 Wall Mounts

- Mounting Accessories

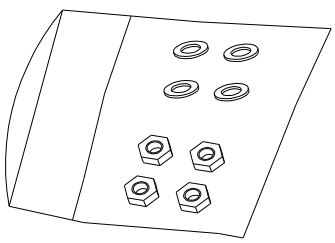

Figure 3-2 Nuts and Flat Washers

3.1.2 Mounting with a Long Mount

Steps:

1. Drill four holes in the wall. Insert M6 expansion screws (not supplied) into the mounting holes.

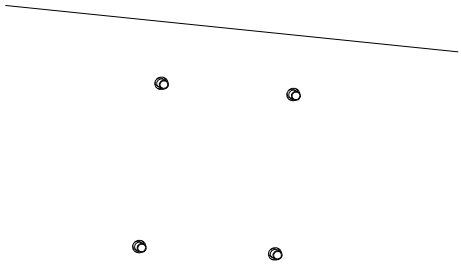

Figure 3-3 Drill the Holes in the Cement Wall

2. To secure the wall mount, screw hex nuts padded with flat washers through the wall mount and the rubber gaskets to the expansion screws.

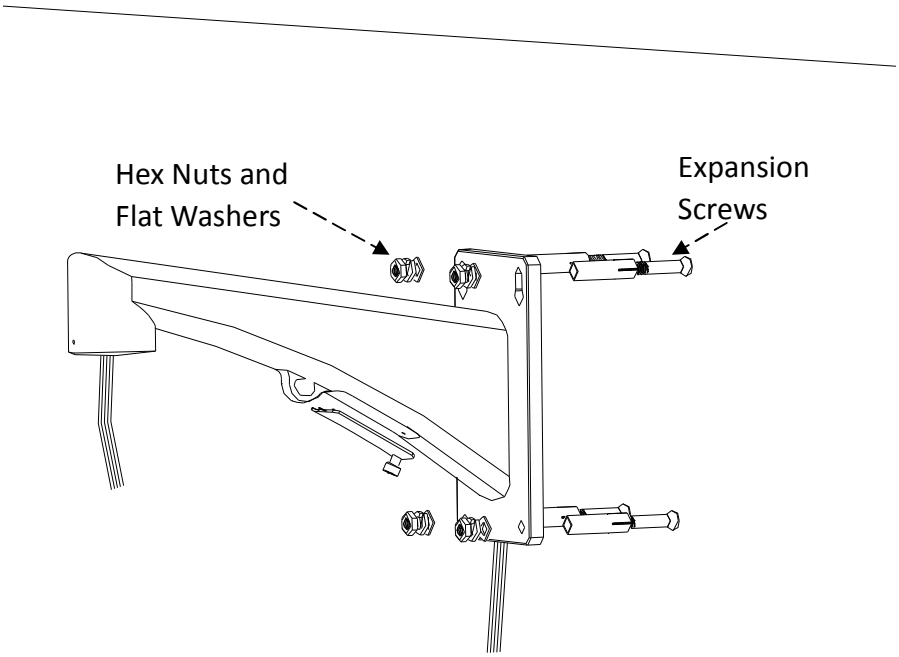

Figure 3-4 Secure the Mount

3. Install the dome to the mount

Please refer to Chapter 1 for dome installation.

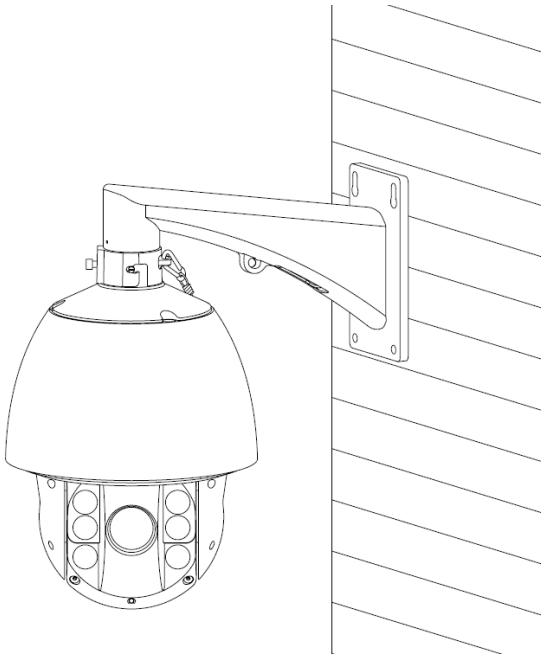

Figure 3-5 Finish the Installation

3.1.3 Mounting with a Power Supply Box

Steps:

1. Drill four holes in the wall. Insert M10 expansion screws (not supplied) into the mounting holes.
2. To secure the power supply box, screw hex nuts padded with flat washers through the power supply box and the rubber gaskets to the expansion screws.

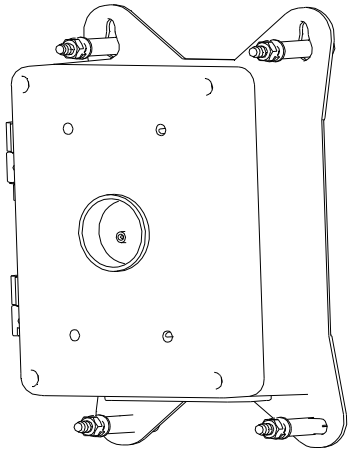

Figure 3-6 Install the Power Supply Box

3. Position the wall mount to the power supply box and tighten the screws.

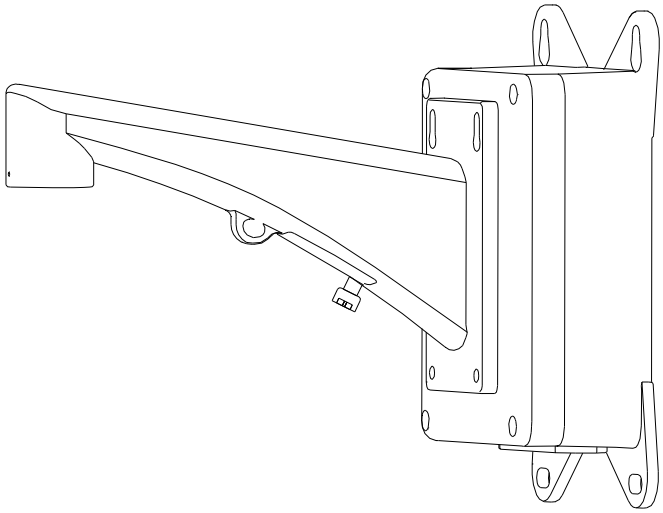

Figure 3-7 Install the Mount

4. Install the dome to the mount

Please refer to Chapter 1 for dome installation.

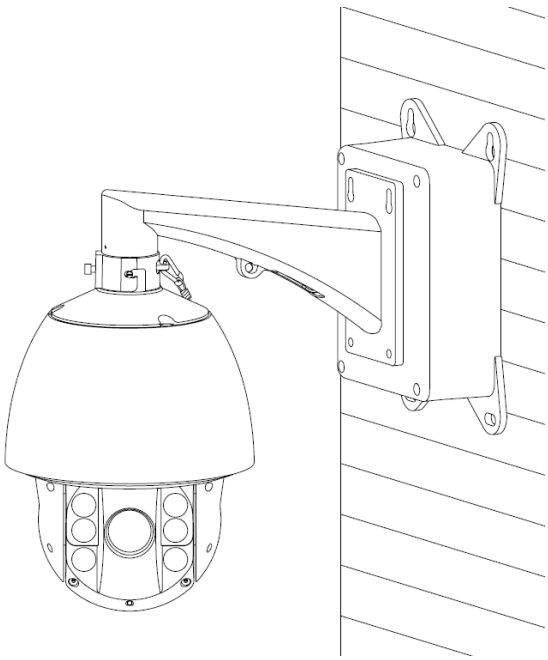

Figure 3-8 Finish the Installation

3.2 Corner Mounting

Note: Corner mounting is applicable to indoor/outdoor 90°corner constructions.

3.1.1 Components

- Mounts

A corner mount has to be used together with a wall mount for corner mounting applications.

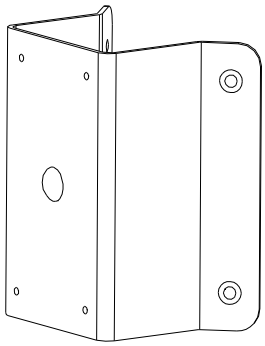

Figure 3-9 Corner Mount

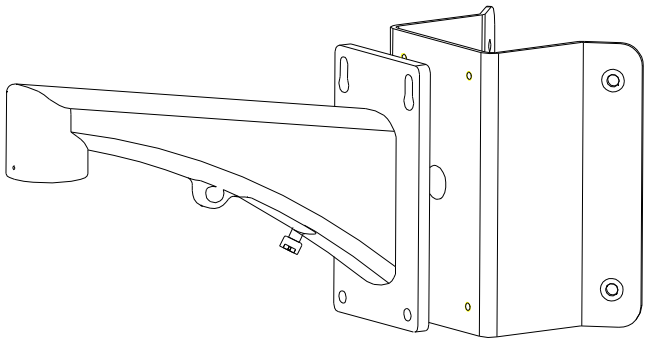

Figure 3-10 Corner Mount and Wall Mount

- Mounting Accessories

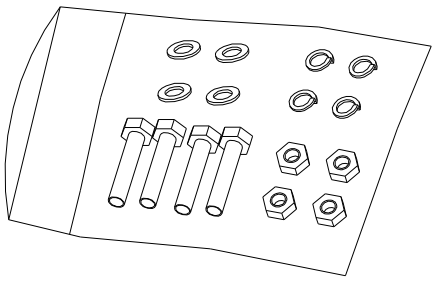

Figure 3-11 Hexagonal Screws (M8×30), Nuts, Spring Washers and Flat Washers

3.1.2 Corner Mounting Instructions

Steps:

1. Drill four holes in the corner. Insert M6 expansion screws (not supplied) into the holes.
2. Pass the power cord, video cable and control cable through the opening of the corner adapter.

Note: Make sure the cables are long enough. For outdoor applications, you can use sealant to seal the cable openings for waterproofing.

3. Align the four holes of the corner adapter with the four expansion screws in the corner.
4. Screw the nuts and washers to the expansion screws to secure the corner adapter.

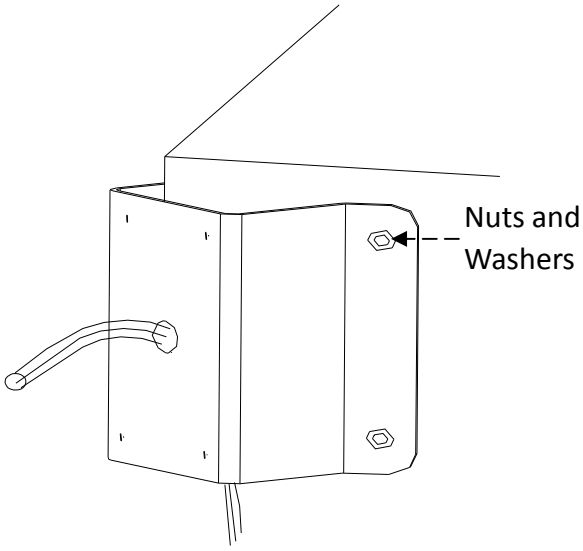

Figure 3-12 Install the Corner Mount

5. Position the wall mount to the corner adapter.
6. Insert the hex screws with the spring washers through the wall mount and the gaskets, and tighten them to the corner mount.

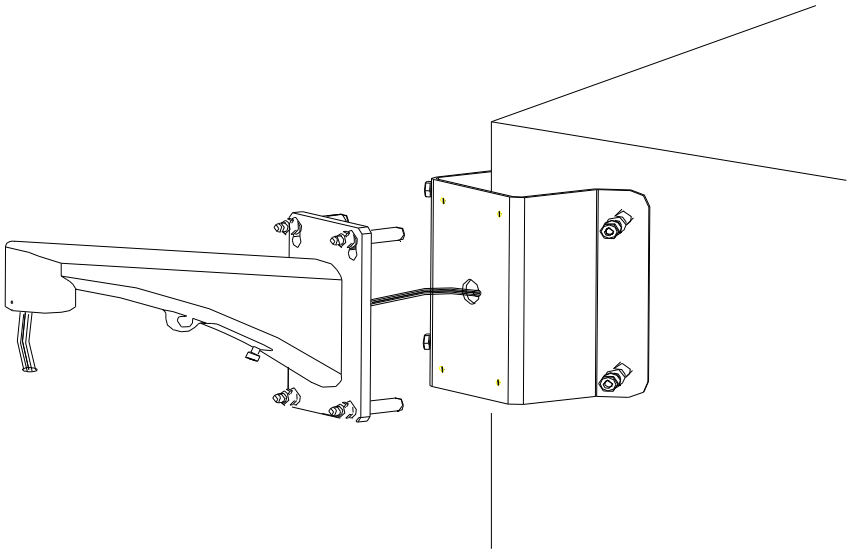

Figure 3-13 Install the Wall Mount

5. Install the dome to the mount

Please refer to Chapter 1 for dome installation.

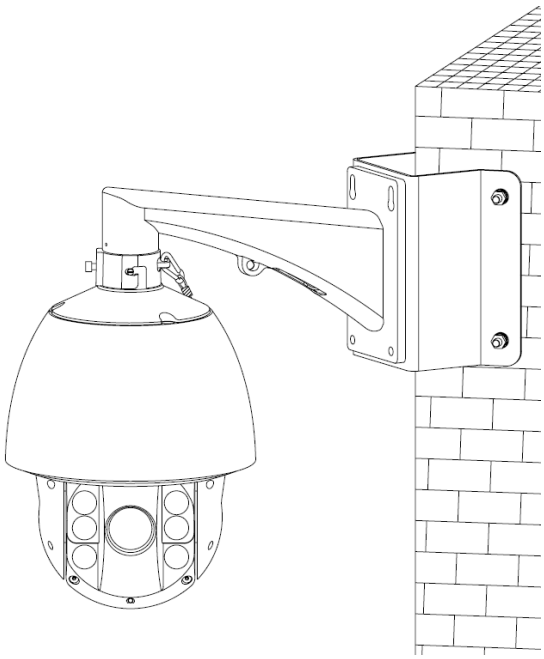

Figure 3-14 Finish the Installation

3.3 Pole Mounting Applications

Note: Pole mounting is applicable to the indoor/outdoor pole constructions

3.1.3 Mounting Components

- Mounts

A pole mount has to be used together with a wall mount for pole mounting applications.

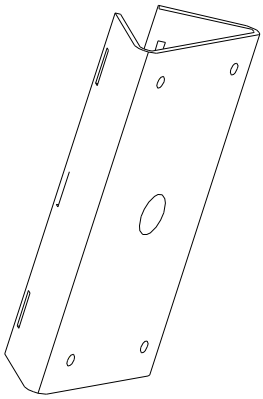

Figure 3-15 Pole Mount

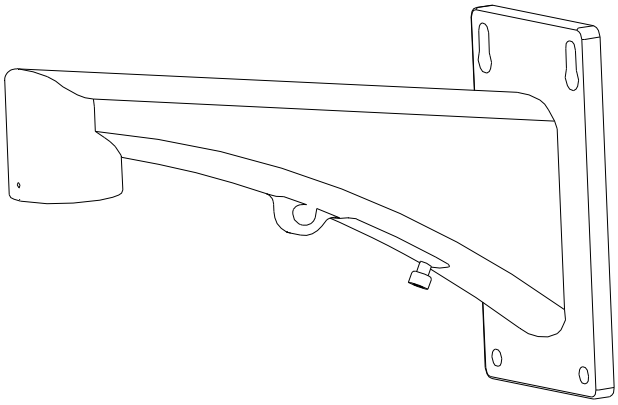

Figure 3-16 Wall Mount

- Pole Mounting Hoop

Pole mounting hoop is used for pole mounting with pole mount and wall mount. There are following dimensions selectable: ϕ59-82mm, ϕ84-108mm, ϕ103-127mm, ϕ130-152mm, ϕ155-178mm, ϕ180-203mm and ϕ194-216mm. Dimensions can be customized according to users' demand.

Note: The dimensions of the pole mounting hoop must fit the diameter of the pole mount.

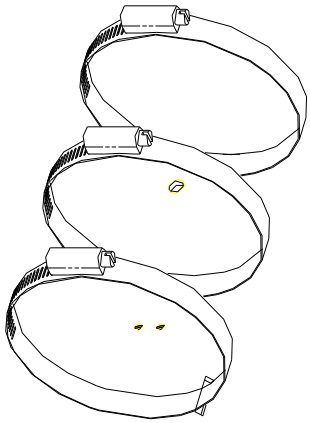

Figure 3-17 Pole Mounting Hoops

- Mounting Accessories

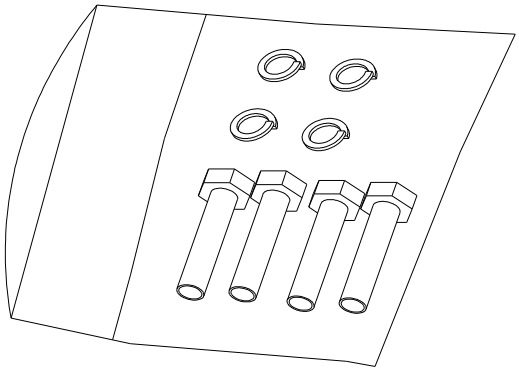

Figure 3-18 Hexagonal Screws (M8×30) and Spring Washers

3.1.4 Pole Mounting Instructions

Steps:

1. To assemble pole mount and pole mounting hoops, loosen the hoops with a screw driver and insert them through the holes of the mount.

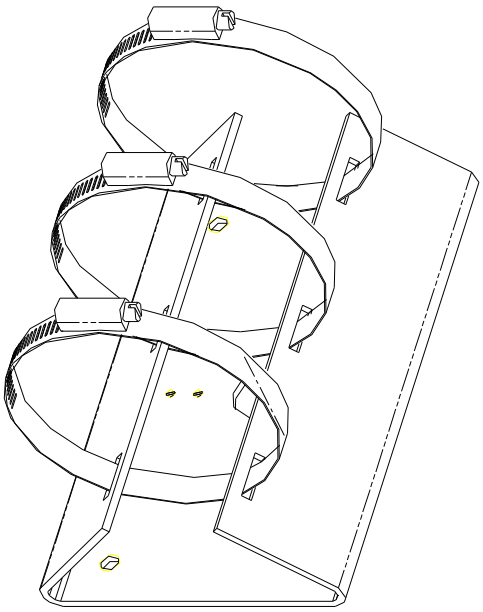

Figure 3-19 Assemble the Hoops and the Pole Mount

2. Pass the power cord, video cable and control line through the opening of the pole mount.

Note: Make sure the cables are long enough. For outdoor applications, you can use sealant to seal the cable openings for waterproofing.

3. Open the hoops and clip them to the pole. Close the hoops and fasten the screws tightly.

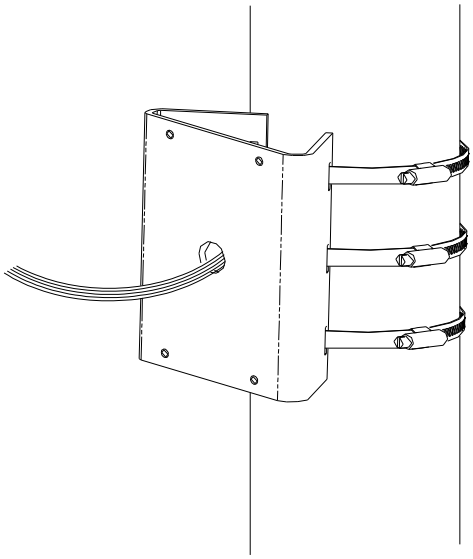

Figure 3-20 Install the Pole Mount

7. Position the wall mount to the pole adapter.

8. Insert the hex screws with the spring washers through the wall mount and the gaskets, and

tighten them to the pole mount.

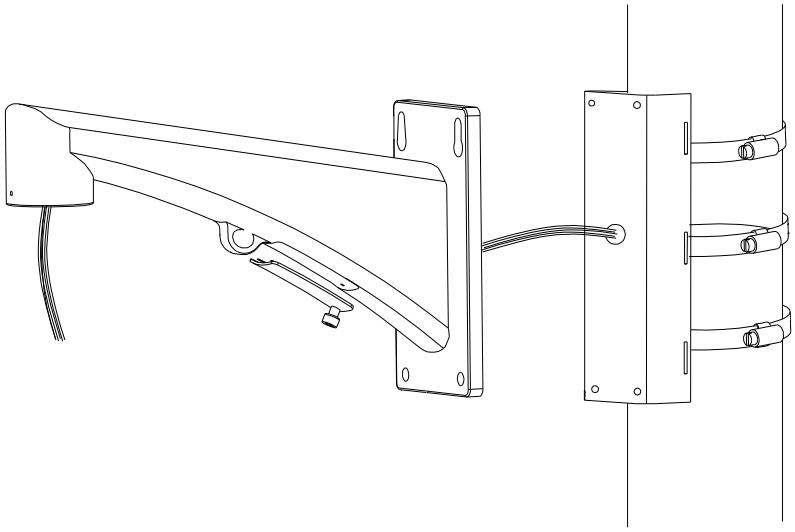

Figure 3-21 Install the Wall Mount

6. Install the dome to the mount

Please refer to Chapter 1 for dome installation.

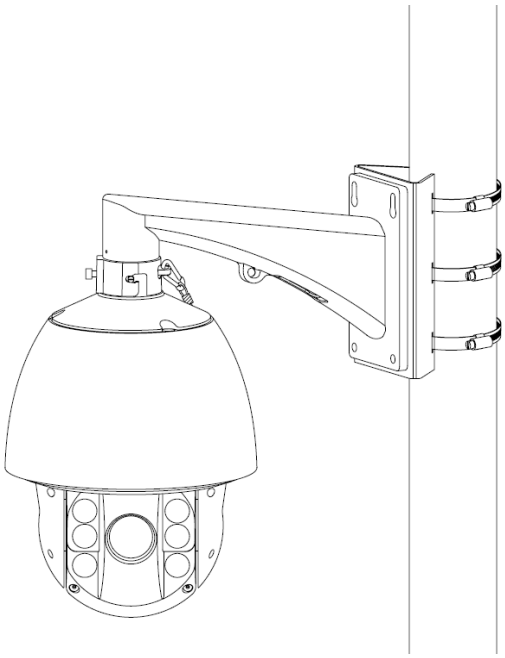

Figure 3-22 Finish the Installation

Appendix 1 Lightning and Power Surge Protection

This product adopts TVS plate lightning protection technology to avoid damage caused by pulse signal that is below 3000W (Eg, Lightning , power surges and etc.) Necessary protections must be taken to secure the electrical safety outdoors.

1. The distance between signal transmission line and high-voltage equipment or high-voltage cable is at least 50m.
2. Outdoor wiring should be along the eaves.
3. In the open areas, wires should be buried underground in sealed steel pipes, and the steel pipes should be one-point grounded. Overhead routing is forbidden.
4. In strong thunderstorm situations or high induction voltage areas (such as areas of high-voltage transformers), high power lightning protection apparatus and lightning conductor are necessary.
5. The installation, wiring, lightning and grounding protection of this product should be part of the protection system of the building where this product is installed, and conform to the related national standards and industry standards.
6. Equipotential grounding should be applied for this product. The grounding equipment must meet anti-jamming and electric safety requirements, and it's not allowed to connect to the zero line of strong power grids. For individual grounding, the resistance should not exceed 4Ω, and the sectional area should not be less than 25 mm^2. For detailed grounding instructions, please refer to *Installation Manual of Speed Dome*.

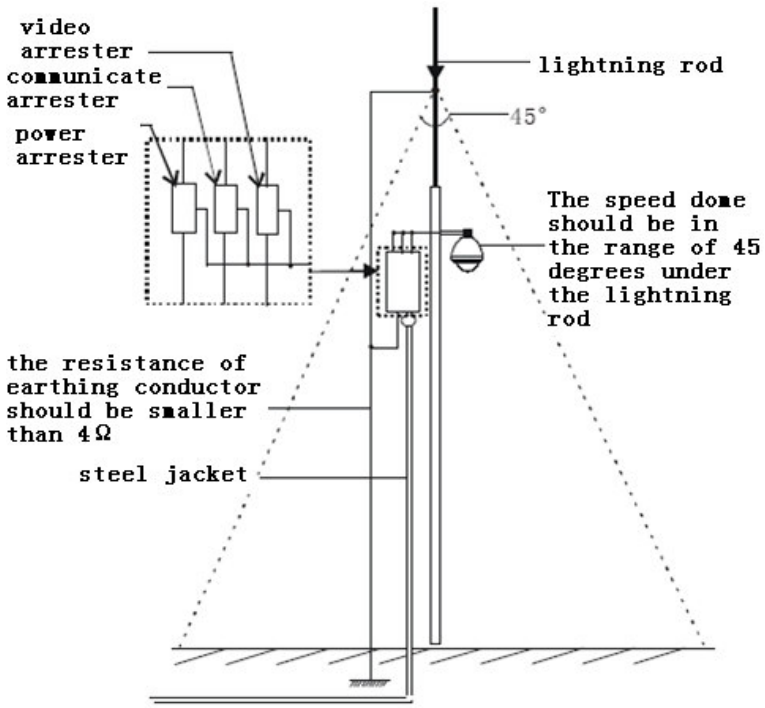

Figure A. 1 Lightning Protection and Grounding

Appendix 2 RS485 Bus Connection

1. RS485 Bus Properties

RS485 is a half-duplex communication bus which has 120Ω characteristic impedance, and its maximum load ability is 32 payloads (including controlling devices and controlled devices).

2. RS485 Bus Transmission Distance

Using 0.56mm (24AWG) twisted-pair line, the max transmission distances for different baud rates are shown as below:

Baud Rate	Max Distance
2400BPS	1800m
4800BPS	1200m
9600BPS	800m

Table A.1 Matched Resistance Settings

The transmission distance may decrease if a thinner cable is used, or the device is under a strong electromagnetic interference, or a bus is shared by multiple devices; vice versa.

3. RS485 Bus Connections

According to the industry standard, daisy-chain connection can be adopted for RS485 bus connections, with a 120Ω terminal resistor connected to both ends (as shown in Diagram 1). A simplified connection can also be applied in the cases that distance “D” is within a limited range (as shown in diagram 2).

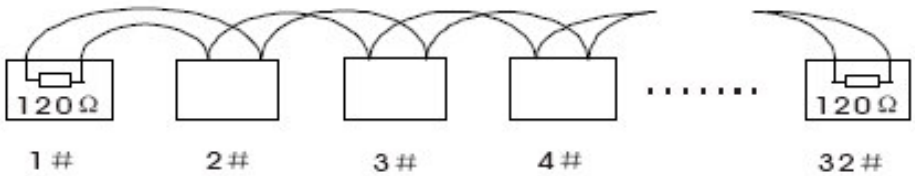

Figure A. 2 Daisy-chain Connection

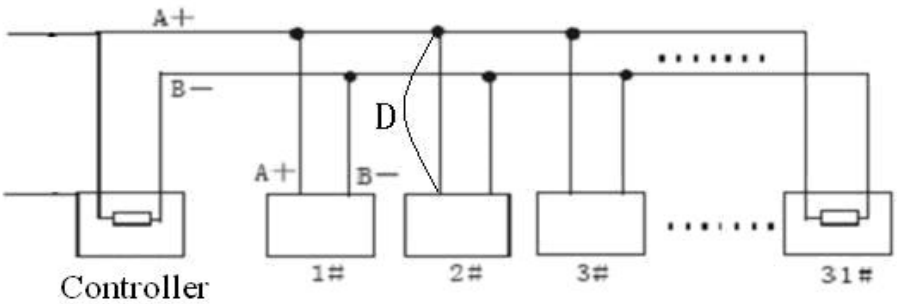

Figure A. 3 Simplified Connection

4. Terminal Resistor Connection

The 120Ω terminal resistors can be connected through the DIP switch on the circuit board and default as disconnected. To connect the resistor, simply switch on the eighth position of SW2. Please refer to section 1.3 for more about DIP switch settings.

5. RS485 Distributer Installation

In star-shaped construction (as shown in Figure A.4), terminal resistors are normally installed to the end devices with a long spacing distance (eg. In Figure A.4, devices 1# and 15#). There will be problems such as signal reflection, anti-jamming ability decline and dome running out of control in this case.

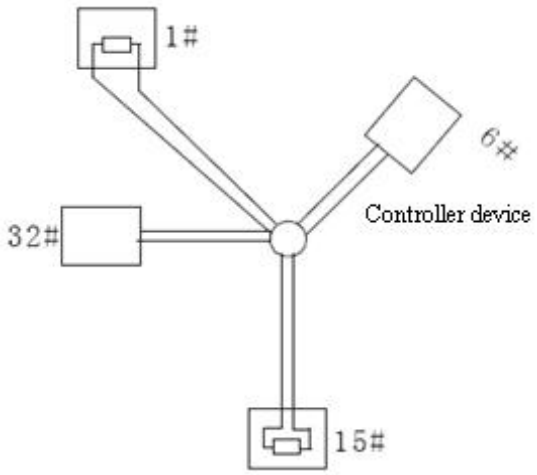

Figure A. 4 Star-shaped Connection

You can install a RS485 distributer which can effectively help to avoid those problems and improve communication reliability. Please see Figure A.5.

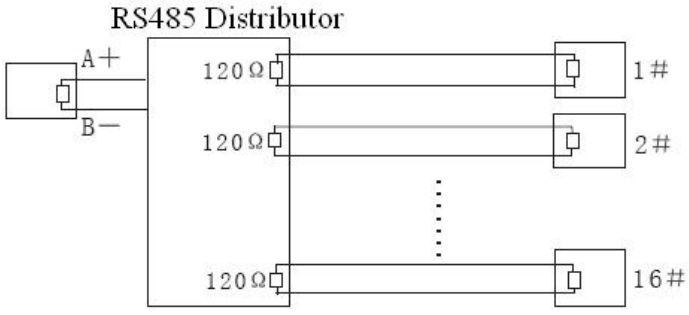

Figure A. 5 RS485 Distributer

6. FAQ about RS485 Bus

Fault Phenomenon	Probable Cause	Solutions
The speed dome do the self-check but can not be controlled.	1. The address or Baud Rate is not matched between Host and the Speed Dome.	1. Adjust the address or Baud Rate of Host or Speed Dome to make a match.
	2. RS485+,- are connected incorrectly.	2.Change the RS485+ and RS485- wires.
	3. Wiring drops,	3.fastening the wire
	4. RS485 wire broke;	4. Change RS485 wire.
The speed dome can be controlled but not smoothly	1. loose contact of RS485	1. fastening RS485 wire;
	2. one RS485 wire broke;	2. Change RS485 wire.
	3. Host and speed dome are too far away	3. Add terminal matched resistance
	4. Too many speed domes are connected	4. Add RS485 distributor

Table A.2 RS485 Bus FAQs and Solutions

Appendix 3 Wire Gauge Standards

Bare Wire Gauge (mm)	American Wire Gage AWG	(British)Standard Wire Gauge SWG	Cross-sectional Area of Bare Wire mm
0.050	43	47	0.00196
0.060	42	46	0.00283
0.070	41	45	0.00385
0.080	40	44	0.00503
0.090	39	43	0.00636
0.100	38	42	0.00785
0.110	37	41	0.00950
0.130	36	39	0.01327
0.140	35		0.01539
0.160	34	37	0.02011
0.180	33		0.02545
0.200	32	35	0.03142
0.230	31		0.04115
0.250	30	33	0.04909
0.290	29	31	0.06605
0.330	28	30	0.08553
0.350	27	29	0.09621
0.400	26	28	0.1257
0.450	25		0.1602
0.560	24	24	0.2463
0.600	23	23	0.2827
0.710	22	22	0.3958
0.750	21		0.4417
0.800	20	21	0.5027
0.900	19	20	0.6362
1.000	18	19	0.7854
1.250	16	18	1.2266
1.500	15		1.7663
2.000	12	14	3.1420
2.500			4.9080.
3.00			7.0683

Table A.3 Wire Gauge Standards